

## COMMUNICATION DEVICE

FIELD OF THE INVENTION

The present invention relates to a communication device wherein  
5 an operating procedure can be set and enrolled by a user.

BACKGROUND OF THE INVENTION

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In conventional communication devices, there is the one in which  
a plurality of functions involved in the communication device can be  
10 stored in an arbitrary combination. In such communication device as  
described above, some functions, which have been previously set and  
enrolled by a user are effected by such operations as depression of  
setting keys, and the following depression of ten-key pads as to which  
some functions have been previously enrolled.

15 Furthermore, an example of a so-called one-touch operation wherein  
a plurality of functions has been stored previously in one of keys, and  
the plurality of functions stored is conducted by pushing down the key  
unlike the above-described case wherein a plurality of keys are pushed  
down to execute some functions is described in Japanese Patent Laid-Open  
20 No. 9-18559.

In conventional communication devices, however, such operation  
that a user must once enter in an enrolled mode and select functions  
to be enrolled in the case where the user wishes to enroll a plurality  
of functions. Accordingly, the user goes to some trouble for entering  
25 into such enrolled mode, so that it is inconvenient for the user.

Furthermore, in conventional communication devices, a series of  
operational procedures cannot be enrolled. but merely functions  
themselves can be enrolled. In these circumstances, operational

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procedures of functions, which are used frequently by a user, cannot be enrolled. In this respect, a user must input each of operational procedures, so that the user cannot obtain acceptable results as to operability.

5 Moreover, since a conventional device has not been provided with a function for confirming a desired function to be applied by a user before execution thereof, there is a fear of conducting erroneously a function that is not intended by the user.

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#### SUMMARY OF THE INVENTION

Accordingly, the present invention has been made in view of the problems involved in conventional communication devices as mentioned above.

15 An object of the present invention is to provide a communication device by which user's operability can be improved, and erroneous operation can be prevented from occurrences.

In order to achieve the above-described object, a communication device according to the present invention comprises a key-input section in which key operations are implemented by a user; a key-operation storing  
20 section for storing key-input information input in the key-input section; a display section for displaying the key-input information, which has been stored in the key-operation storing section; a non-volatile memory section for storing key-input information selected by the user with the use of the key-input section from the key-input information displayed  
25 on the display section as a series of combination of key-input information; and a control section for executing sequentially the key-input information, which has been stored in the non-volatile memory section as the series of combination of key-input information.

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According to the above-described communication device of the present invention, key-input information, which has been input by a user through user's key operation, may be combined with each other, and the key-input information thus combined can be stored. Hence, an  
5 operational procedure for functions, which have been frequently used by the user, may be enrolled, whereby it can be easily executed, so that user's operability is improved.

Furthermore, the above-described display section may have such constitution that it displays the key-input information in accordance  
10 with such an order that the key-input information was stored in the key-operation storing section.

Moreover, the above-described key-input information in the form of the series of combination may be stored in the above-described non-volatile memory section in a condition in which a functional name  
15 has been assigned to the key-input information.

Further, the above-described key-input information in the form of the series of combination may be allocated to a softkey disposed in the key-input section to be enrolled.

Still further, the above-described control section may have such  
20 constitution that it makes a display of an indication for confirming whether execution of the key-input information is started or not on the display section before executing sequentially the key-input information in the form of the series of combination, and the execution of the key-input information is started in the case where there was such an  
25 input to the effect that the execution of the key-input information should be started by a user through the key-input section.

As a result, the user can decide whether it should be executed or not after confirming contents of such execution by himself (or herself).

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Therefore, it can be prevented from erroneous execution of a function, which has not been intended to execute by the user.

Yet further, a capability for transmitting and receiving e-mail may be involved in the above-described communication device, and the  
5 key-input information in the form of the series of combination relates to an operational procedure for transmission and/or reception of e-mail.

Besides, a capability for linking to Internet may be involved in the above-described communication device, and the key-input information  
10 in the form of the series of combination relates to an operational procedure for accessing to a specific site on Internet.

As described above, an operational procedure for transmission and/or reception of e-mail, or an operational procedure for accessing to a specific site on Internet have been previously enrolled, whereby  
15 it can be prevented from erroneous input of an e-mail address by a user. Accordingly, it becomes possible to prevent erroneous transmission of an e-mail to a different address, or erroneous accessing to Internet, which has not been intended by a user.

20 BRIEF DESCRIPTION OF THE DRAWINGS

The present invention will be explained in more detail in conjunction with appended drawings. wherein:

FIG. 1 is a block diagram illustrating an outlined constitution of an embodiment of a communication device according to the present  
25 invention;

FIG. 2 is a flowchart for explaining a series of operations in the communication device shown in FIG. 1;

FIG. 3 is a flowchart for explaining another series of operations

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in the communication device shown in FIG. 1;

FIG. 4 is a flowchart for explaining a further series of operations in the communication device shown in FIG. 1;

FIG. 5 is a flowchart for explaining a still further series of operations in the communication device shown in FIG. 1; and

FIG. 6 is a flowchart for explaining a yet further series of operations in the communication device shown in FIG. 1.

#### DESCRIPTION OF THE PREFERRED EMBODIMENT

10 In the following, an embodiment of the present invention will be described in detail by referring to the accompanying drawings wherein FIG. 1 is a block diagram illustrating an embodiment of a communication device according to the present invention.

Referring to FIG. 1, a communication device of the present  
15 embodiment comprises a key-input section 1 for setting key operations by a user; a device control section 2 for analyzing contents, which have been input through keys to store setting results relating thereto or to control an output device based thereon; an output device 3 for displaying data, which have been set out, and sounding for certain  
20 purposes; a key-operation storing section 4a for storing key-operations, which were set out by a user; a non-volatile memory section 4b for storing data, which have been deposited in the key-operation storing section 4a, into a non-volatile area; and a storage device section 4 involving a functional name storage section 4c for enrolling functional names of  
25 key-input information.

The key-input section 1 involves soft key to which a plurality of functions may be allocated other than so-called ten keys and function keys. Key data presented by pushing down a keypad by a user is transmitted

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to the device control section 2. The device control section 2 analyzes the key data from the key-input section 1 to execute storage and erasure of key-input information. The device control section 2 transmits also display data to be displayed on an LCD (liquid crystal display unit) of the output device 3 in conformity with an operation conducted.

The output device 3 is composed of an LCD, a speaker, a receiver and the like, and the output device 3 displays data assigned by the device control section 2 by means of images and sounds.

The key-operation storing section 4a of the storage device section 4 is allowed to analyze key-data, i.e., key-input information input from the key-input section 1 by means of the device control section 2, and stores the data analyzed. Furthermore, the key-operation storing section is used also in the case when key-input information, which is stored in the non-volatile memory section 4b in the event where, key-input information is compiled, is developed. The non-volatile memory section 4b stores data transmitted from the key-operation storing section 4a and the functional name storage section 4c in the case when storage names of key-input information and softkeys are fixed.

The functional name storage section 4c stores a functional name of a softkey executing key-input information relating thereto in the case when the key-input information is fixed.

Operations of the above-described communication device will be described in more detail hereinafter.

Referring again to FIG. 1, key-data input in the key-input section 1 is analyzed in the device control section 2, and the results analyzed are displayed on an LCD of the output device 3. As a result of analysis of the key-data in the device control section 2, when the results require an enrollment of key-input information, histories of key-input

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information, which have been heretofore stored in the key-operation storing section 4a as a result of inputting such information is displayed on the LCD of the output device 3 in older sequence. When certain key-input information is required to be stored, it is fixed by a user's  
5 key operation. Storage of certain key-input information is not required; such key-input information is erased by a predetermined key-operation.

As a result of analysis of key-data, which was input by the key-input section 1, in the device control section 2, when the key-input information  
10 is required to be fixed, such key-input information is stored in the non-volatile memory section. Then, the following key-input information, which has been stored in the key-operation storing section 4a, is displayed on the LCD of the output device 3, and such key-input information is stored in the non-volatile memory section 4b in accordance  
15 with the same manner as that described above. In this occasion, key-input information is stored in the non-volatile memory section 4b in the form of a series of combination. As a result of repeating such operation, when all the key-input information, which has been stored in the key-operation storing section 4a, is stored in the non-volatile memory  
20 section 4b, completion of enrollment is displayed on the LCD of the output device 3, and further, such message to the effect that a functional name of softkey may be input is displayed on the LCD of the output device 3.

As a result of analysis of key-data in the device control section  
25 2, when the obtained result requests deletion of key-input information, the corresponding key-input information is deleted, and the following key-input information, which has been stored in the key-operation storing section 4a, is displayed on the LCD of the output device 3. Such

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operations are repeated, and when no key-input information exists in the key-operation storing section 4a, such message to the effect that a functional name of softkey may be input is displayed on the LCD of the output device 3. In the case where no key-input information stored in the non-volatile memory section 4b exists, a message to the effect that such decision whether key-input information, which has been stored in the key-operation storing section 4a, is erased or not should be made is output on the LCD of the output device 3.

As a result of analyzing key-data, which was input by the key-  
input section 1, in the device control section 2, when it is in process  
of inputting a functional name of softkey, this situation is maintained  
in the functional name storage section 4c. On one hand, as a result of  
analysis of input data in the device control section 2, when the result  
indicates fixation of a functional name of softkey, the data stored in  
the functional name storage section 4c is linked with key-input  
information, which has been stored in the non-volatile memory section  
4b, and the resulting data is stored in the functional name storage  
section 4c. In the case when it is requested to fix a functional name  
of softkey in a situation where no functional name of softkey has been  
input, default data is linked with key-input information, which has been  
stored in the non-volatile memory section 4b to store the resulting data  
in the functional name storage section 4c. After storage of the data,  
such message to the effect that key-input information was set out on  
the LCD of the output device 3.

25 On the other hand, as a result of analyzing key-data, which was input, in the device control section 2, when it is requested to delete key-input information, all the key-input information residing in the key-operation storing section 4a, the non-volatile memory section 4b,



and the functional name storage section 4c is erased. After completing erasure, a fact of erasure is displayed on the LCD of the output device 3.

After analysis of key-data, which was input by the key-input section 1, in the device control section 2, when the data is obtained as a result of pushing down a softkey, functional names of key-input information, which has been enrolled, are displayed on the LCD of the output device 3, and then, such decision whether a certain functional name of key-input information should be executed or not should be made is displayed on the LCD of the output device 3.

As a result of analyzing key-data, which was input by the key-input section 1, in the device control section 2, when the result directs execution of key-input information, the device control section 2 executes sequentially the key-input information, which has been stored in the non-volatile memory section 4b. In the case when no key-input information is executed, it is judged whether or not there is key-input information, which has been stored other than the information described above. If the other information has been stored, a functional name of the key-input information, which has been enrolled, is displayed on the LCD of the output device 3, and such a message that it is requested to decide whether or not such key-input information should be executed is further displayed on the LCD of the output device 3. In the case where no key-input information has been stored other than that described above, no operation is taken and it shifts to a normal condition.

As a result of analyzing key-data, which has been input by the key-input section 1, in the device control section 2, when it is requested to compile key-input information, the key-input information, which has been stored in the non-volatile memory section 4b, is developed in the

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key-operation storing section 4a, and such a message that there is in process of compiling key-input information is displayed on the LCD of the output device 3.

As mentioned above, in a communication device of the present embodiment, key-input information, which has been input by means of user's key-operation, can be stored in the key-operation storing section 4a as a series of combination. Accordingly, when an operational procedure for certain function, which is frequently employed by a user, is enrolled, such series of operational procedure can be conducted by user's one-touch operation. Thus, operability of a communication device in the present invention is more improved than that wherein a procedure of operations is input one by one, and then, the operational procedure is conducted.

Moreover, a device control section 2 of the communication device of the invention displays an indication for confirming whether or not an operational procedure should be executed before such series of operational procedure selected by a user is practically executed on the LCD of an output device 3. Hence, the user can decide whether the operational procedure should be executed or not after confirming contents of execution by the user himself (or herself), so that it is possible to prevent from application of functions, which is not intended by the user.

Furthermore, when the above-described series of operational procedure is the one for transmission and/or reception of e-mail or the one for accessing to a specific site on Internet, an erroneous input for an address can be prevented, so that it is possible to prevent from erroneous transmission of e-mail or erroneous accessing to an Internet site, which is not an intended site.

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It is to be noted that the present invention is applicable also for a communication device wherein its key operations are complicated and a large amount of data must be handled, in addition to a mobile communication device such as cellular phone, and PHS (registered  
5 trademark).

In the following, setting operation for operational procedure in a communication device of the present embodiment will be described in detail by referring to FIG. 1 as well as to FIGS. 2 through 6. FIGS. 2 through 6 are flowcharts each explaining a series of operations of  
10 the communication device shown in FIG. 1.

In the communication device of the present embodiment, first, a user makes key operations in a key-input section 1, whereby it is started to set an operational procedure. When key-data input by a user is informed upon a device control section 2 from the key-input section 1,  
15 the device control section 2 by which the information was received decides whether the key-data is a request for enrollment of key-input information as shown in FIG. 2 (S1).

As a result of the decision, when the request was the one for enrollment of key-input information, it is decided whether or not there  
20 is key-input information in a key-operation storing section 4a (S2). If there is key-input information in the key-operation storing section 4a, the oldest key-input information is displayed on the LCD of an output device 3 (S3). Thereafter, a situation during enrollment of key-input information is conserved (S4). On the other hand, if there is no  
25 key-input information, a fact to the effect that no key-input information exists is displayed on the LCD of the output device 3 (S5).

Furthermore, as a result of the above-described decision (S2), when it was not a request for enrollment of key-input information, it is judged

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whether or not an operation is in process of enrollment of key-input information (S6). If it is in process of enrollment of key-input information, it is decided whether the key-input information is fixed or not (S7). In the case when the key-input information is fixed, the  
5 corresponding data in the key-operation storing section 4a is stored in a non-volatile memory section (S8). Thereafter, it is decided whether or not there is the following key-input information (S9). When there is the following key-input information, it is displayed on the LCD of the output device 3 (S10). If there is no following key-input information,  
10 a situation where there is in process of enrolling key-input information is altered to a situation where there is in process of inputting a functional name (S11). A screen page for inputting a functional name of a softkey is displayed on the LCD of the output device 3 (S12).

On the other hand, when key-input information is not fixed as a  
15 result of the above-described decision (S7), it is judged whether or not it is a request for changing key-input information as shown in FIG. 3 (S13). When it was a request for changing key-input information, a condition wherein it is in process of the request for changing key-input information is conserved (S14). When it is not a request for  
20 changing key-input information, it is judged whether the request is the one for adding key-input information or not (S15).

As a result of the decision (S15), when it was a request for adding key-input information, a condition where it is in process of requesting addition of key-input information is maintained (S16). On the other hand,  
25 when a request was not the one for adding key-input information, it is judged whether or not key-input information is deleted (S17). In the case where the key-input information is deleted, the corresponding key-input information is deleted from the key-operation storing section

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4a (S18). It is judged whether or not there is the following key-input information (S19). In the case where there is the following key-input information, it is displayed on the LCD of the output device 3 (S20). If there is no following key-input information, a condition for enrolling  
5 key-input information is terminated to conserve a situation where it is in process of inputting a functional name (S21), and a screen page for inputting a functional name is displayed on the LCD of the output device 3 (S22).

As a result of the judgment (S17), when a conclusion is a case other  
10 than that key-input information should be deleted, it is judged whether or not enrollment of key-input information is terminated (S23) as shown in FIG. 4. As a result of the judgment, when the enrollment of key-input information should be terminated, the key-input information, which has been stored in the non-volatile memory section 4c, is erased (S24),  
15 and the communication device is returned to a normal operation (S25). Thereafter, such a screen page wherein a fact to the effect that the communication device is returned to a normal operation is notified is displayed on the LCD of the output device 3 (S26).

On one hand, when enrollment of key-input information should not  
20 be terminated, it is judged whether or not a situation is in process of changing key-input information (S27). If it is in process of changing key-input information, the key-input information, which has been stored in the key-operation storing section 4a is replaced by that based on key-data, which was newly input (S28).

25 On the other hand, if it is a case where a situation is not in process of changing key-input information, it is judged whether or not the situation is in process of adding key-input information (S29). If the situation is in process of adding key-input information, key-input

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information that was newly input is added to the key-input information, which has been stored in the key-operation storing section 4a (S30). If the situation is a case where it is not in process of adding key-input information, no operation is further taken to complete its procedure.

5 As a result of the judgment (S6) shown in FIG. 2, if it is the case where the situation is not in process of enrolling key-input information, it is judged whether or not enrollment of key-input information is deleted as shown in FIG. 5 (S31). If it is a case where enrollment of key-input information should be deleted, the key-input information, which has been  
10 stored in the key-operation storing section 4a, is erased (S32). On the other hand, when it is a case where enrollment of key-input information should not be deleted, it is judged whether or not a request is the one for executing key-input information (S33).

If it is a case where a situation requests execution of key-input  
15 information, a functional name of the key-input information, which has been stored in the non-volatile memory section 4b, is displayed on the LCD of the output device 3 (S34). On the other hand, if it is a case where a situation does not request execution of key-input information, it is decided whether such key-input information is executed or not (S35).

20 In the case where it should be executed, such key-input information, which has been stored in the non-volatile memory section 4b, is sequentially executed (S36). In case of no execution of key-input information, it is judged whether or not a situation is in a case where a functional name is input (S37).

25 If it is in the case where a functional name is input, it is decided whether a functional name is fixed or not (S38). In case of fixing the functional name, a functional name, which has been stored in the key-operation storing section 4a is stored in the functional name storage

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section 4c (S39), and the functional name enrolled is displayed on the LCD of the output device 3 (S40). In case of making no fixation of a functional name, the functional name, which has been stored in the key-operation storing section 4a is updated (S41) as shown in FIG. 6(a).

5 As a result of the judgment (S37), if a situation is in a case where a functional name is not input, it is decided whether or not enrollment of key-input information is to be completed as shown in FIG. 6(b) (S42). In case of completing the enrollment of key-input information, the key-input information, which has been stored in the key-operation storing  
10 section 4a, is erased (S43). In the case where enrollment of key-input information is not completed, key-data, which was input, is stored in the key-operation storing section 4a, and key-input information is updated (S44).

As described above, a communication device according to the present  
15 invention comprises a key-input section in which key operations are implemented by a user; a key-operation storing section for storing key-input information input in the key-input section; a display section for displaying the key-input information, which has been stored in the key-operation storing section; a non-volatile memory section for storing  
20 key-input information selected by the user with the use of the key-input section from the key-input information displayed on the display section as a series of combination of key-input information; and a control section for executing sequentially the key-input information, which has been stored in the non-volatile memory section as the series of  
25 combination of key-input information. Accordingly, a user can enroll an operational procedure of functions, which are frequently employed by the user, so that operability of the communication device can be elevated.

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Moreover, the control section involves such constitution that an indication for confirming whether execution of key-input information should be started or not is displayed on the display section before executing sequentially key-input information as a series of combination of key-input information; and such execution of key-input information is started in the case when the user was made an input for starting the execution of key-input information through the key-input section, whereby it may be prevented from occurring erroneous execution of functions, which is not intended by the user.

10           The presently disclosed embodiment is therefore considered in all respects to be illustrative and not restrictive. The scope of the invention is indicated by the appended claims rather than the foregoing description, and all changes that come within the meaning and range of equivalents thereof are intended to be embraced therein.